

Ethylene Oxide Ambient Sampling Plan for Steri-Tech (Salinas, PR)

Objective: Determine ambient air concentrations of ethylene oxide (EtO) over a 1-week time frame at locations within one mile of the Steri-Tech facility. Human exposure modeling indicates high risks associated with emissions from the facility.

Method: The EtO sampling will utilize the TO-15A method for Volatile Organic Compounds (VOCs) using stainless steel SUMMA™ canisters. The sampling duration will be 24-hours with the sample changeouts occurring in the mornings (AM). Meteorological data (wind speed, wind direction, temperature, relative humidity) will be collected for the duration of the project for use in data analysis at least at one location.

Sites: A total of six fixed sampling locations will be selected based on EPA dispersion modeling and representative wind data¹.

The locations will include:

- Four locations downwind of the facility in the neighboring residential community
- One location north/northeast of the facility
- One location predominantly upwind of the facility

Sampling locations will adhere to siting criteria in the National Air Toxics Trends Station (NATTS) Technical Assistance Document² to the greatest practical extent. Siting decisions will also serve to avoid potentially biasing interferences such as cigarette smoke and direct vehicle emissions.

EtO is a human carcinogen. Scientific evidence in humans indicates that exposure to EtO for many years increases the risk of cancers of the white blood cells, including non-Hodgkin lymphoma, myeloma, and lymphocytic leukemia. People who live near facilities that release EtO to the outdoor air may be exposed to EtO, depending on how much EtO is released and how close they live to the facility. The greatest cancer risk is for people who have lived near a facility releasing EtO into the air for their entire lifetime.³

EPA modeled annual average EtO concentrations in the vicinity of the Steri-Tech facility. Estimates of the ambient concentrations of EtO were made using the AERMOD dispersion model. The modeling results indicate annual average concentrations in excess of 2.0 µg/m³ of EtO adjacent to the facility. Modeled concentrations in the Salinas Municipio are shown in Figure 1. Sampling locations for this project were selected based on the modeling results.

¹ Wind rose data indicates that the predominate wind direction is from the southeast. See Figure 2.

² See [National Air Toxics Station \(NAATS\) Technical Assistance Document](#)

³ <https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide>

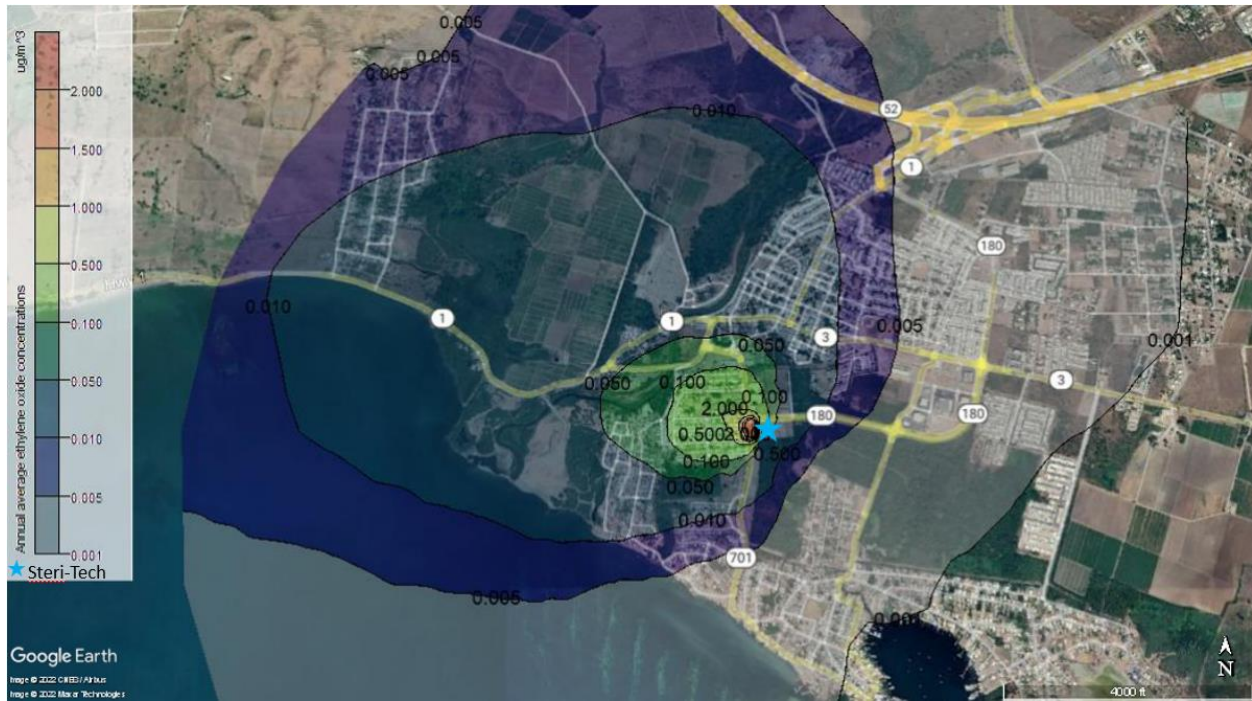
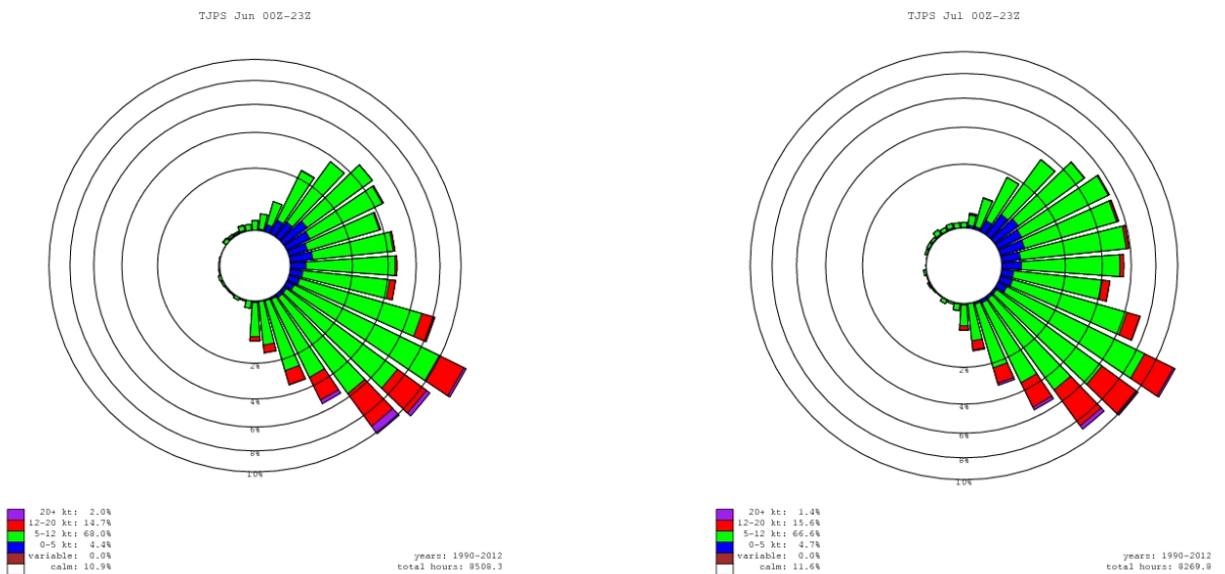


Figure 1: Modeled annual average EtO concentrations in the Salinas Municipio.

Wind direction in Puerto Rico from June through September is predominantly from the southeast and plays a role in the selection of sampling sites. 1983-2012 wind roses for Ponce, PR, are shown in Figure 2. The majority of sites will be located to the west and northwest of the facility which is in the predominate downwind direction.



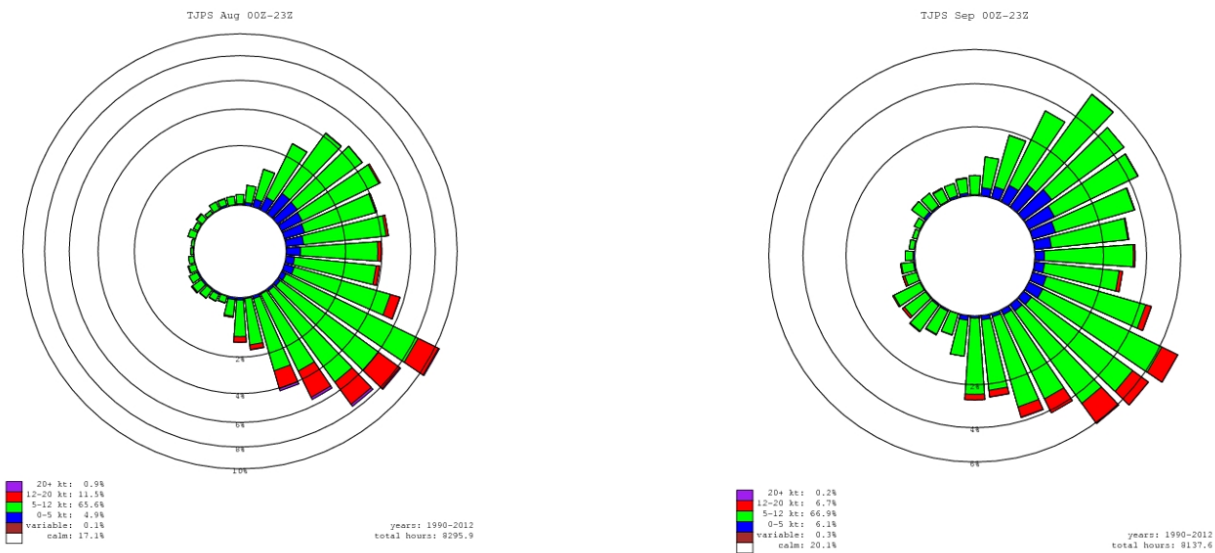


Figure 2: Wind roses for Ponce, PR (https://www.weather.gov/sju/climo_aviation)

Sampling locations: Sampling locations were selected based on the results of the EPA modeling and predominant wind direction. 3 target sampling zones were formed based on areas that were determined as high, low, and background concentrations. Sampling locations around the Steri-Tech facility are shown on Figure 3. Four locations will be located downwind from the facility in the area identified by the red box (approximately 0.15 mi²). The area in the red box is in the highest modeled concentration area. One sampling location will be located upwind from the facility in the low modeled concentration (area within the yellow box). One sampling location will be located to the east of the facility as identified by the green box. The site in the green box area will serve as the background site. The sampling locations on Figure 2-3 may vary slightly when the project begins due to logistical and siting issues. The predominant wind direction is from the southeast throughout the year.

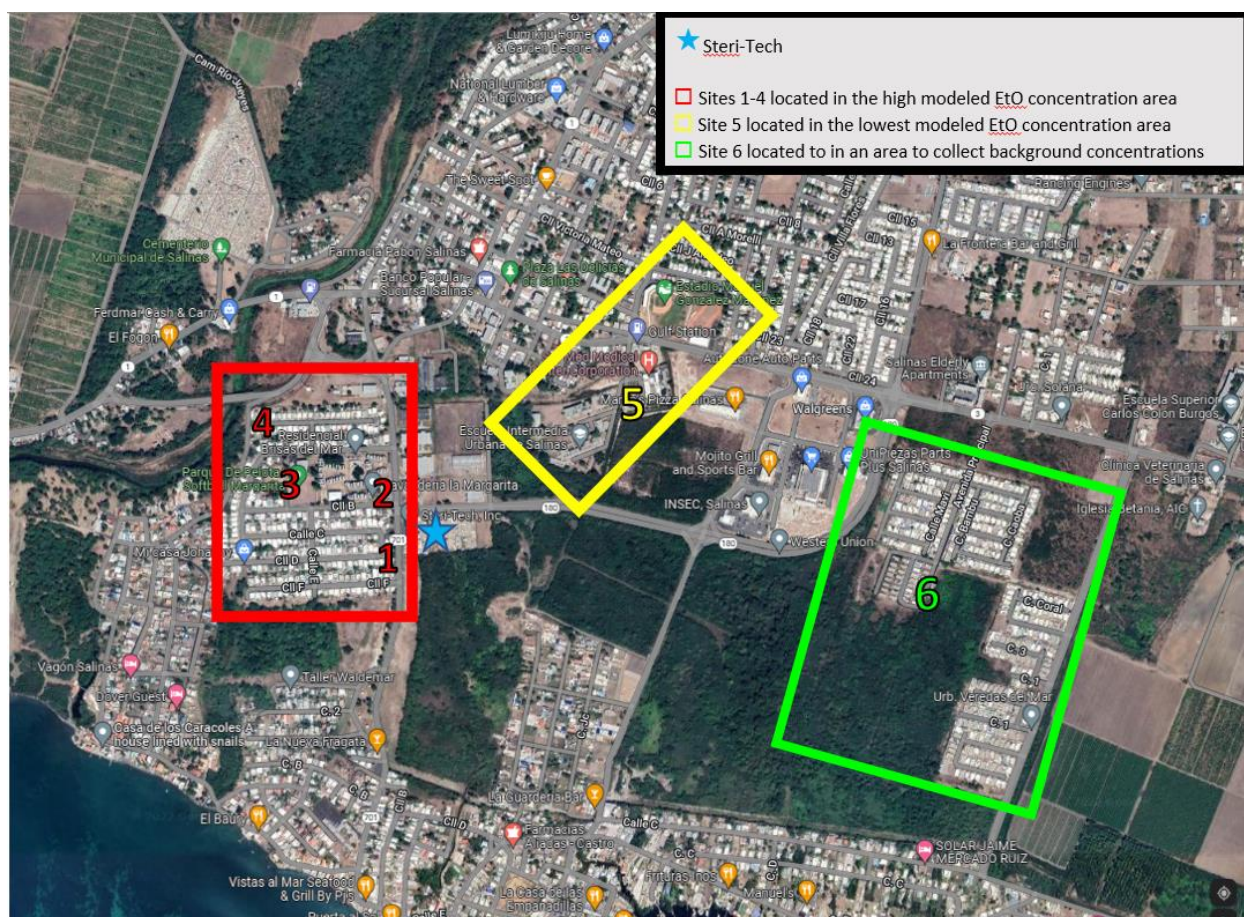


Figure 3: Sampling Locations

Site #	Location Description	Latitude	Longitude	Location ID
1	Street D A34 (Hacienda Las Margaritas)	17.970760	-66.301033	HLM-SA-0A34-STD-OFY
2	PRASA La Margarita Well (Street B)	17.971899	-66.301188	HLM-SA-0LMW-STB-OA1
3	Hacienda Margarita Baseball Park Utility Pole Street B front of Residence BC-11	17.972295	-66.303420	HLM-SA-BC11-STB-UTP
4	Street 1 B2 (Ext. Las Margaritas)	17.973439	-66.304027	ELM-SA-00B2-ST1-OBY
5	SurMed Hospital Agustin Colon Pacheco Street	17.974159	-66.295334	SMD-SA-0000-SAC-OA2
6	Valles de Salinas Residential Development Principal Avenue Residence C11	17.969763	-66.288459	VDS-SA-0C11-STC-UTP

Sampling Frequency: Sampling will occur on a 24-hr basis over a one-week period. 42 field samples are expected to be taken. An additional 7 duplicate samples and 7 blank samples will also be taken for quality control. 56 samples are expected to be taken in total. Excluding duplicate and blank samples, 28 samples will be taken in the red area, 7 in the yellow area, and

7 in the green area. The project sampling completeness target is 85%, which is 36 valid samples. If 36 valid samples cannot be collected in 14 days, monitoring will continue until 36 valid samples are collected. Each sampling day will begin at the 1st location at 9:00 Atlantic Standard Time (AST). Locations 2 through 5 will be sampled consecutively in order after Location 1. This order will be maintained throughout the sampling schedule to obtain a 24 ±1 hr duration for each sample. Field sampling at all 6 locations is expected to take place between 9:00 AST and 11:00 AST. EPA Region 2 will be handling on-site logistics including field deployment and canister shipping. The field team will be shipping canisters used canisters back to ERG on 8/11, 8/15 and 8/22. Additional sampling upon completion of the study at the same locations will be considered if it is determined that additional ambient EtO data is needed.

Project Duration: Sampling will continue for one week with a projected start-up date of approximately August 8th, 2022. EPA's observation is that the facility will be operating during the project duration as the only time periods when the facility shuts down is for maintenance during the holidays when Steri-Tech clients are also shut down for maintenance.

Data Reporting and Validation: ERG will validate and report data to the EPA Contract Officer Representative (COR) within 90 days of the completion of sampling. Concentration data less than the laboratory Minimum Detectable Limit (MDL) will be flagged with the qualifier code MD (which means less than MDL). The MDL will be reported with the concentration. The EPA COR will disseminate the information to EPA Region 2 and other personnel.

Upon completion of the sampling, EPA should request Steri-Tech to make production and EtO usage data available for the week of August 8th- 18th. The production data would include, but not be limited to: operating hours, number of products processed, thermo oxidizer operating parameters, and boiler operating parameters which control emissions from three aeration rooms.

Quality Assurance: An EPA approved QAPP will be developed and used throughout the sampling study. One collocated canister will initially be deployed per sampling day at one of the maximum receptor locations to calculate precision. The location of the collocated sample may optionally be rotated through other sampling locations if early data results indicate above MDL readings at other than maximum concentration locations. Additional blank canisters and laboratory replicates will be employed per ERG's standard practice for the NATTS program.